

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
28 July 2005 (28.07.2005)

PCT

(10) International Publication Number  
**WO 2005/069506 A1**

(51) International Patent Classification<sup>7</sup>: **H04B 7/04**,  
H04L 27/02

(74) Agent: WATKIN, Timothy, Lawrence, Harvey; Lloyd  
Wise, Tanjong Pagar, P.O. Box 636, Singapore 910816  
(SG).

(21) International Application Number:  
PCT/SG2004/000022

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.

(22) International Filing Date: 20 January 2004 (20.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): **AGENCY  
FOR SCIENCE, TECHNOLOGY AND RESEARCH**  
[SG/SG]; 20 Biopolis Way, #07-01 Centros, Singapore  
138668 (SG).

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,  
GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).

(72) Inventors; and

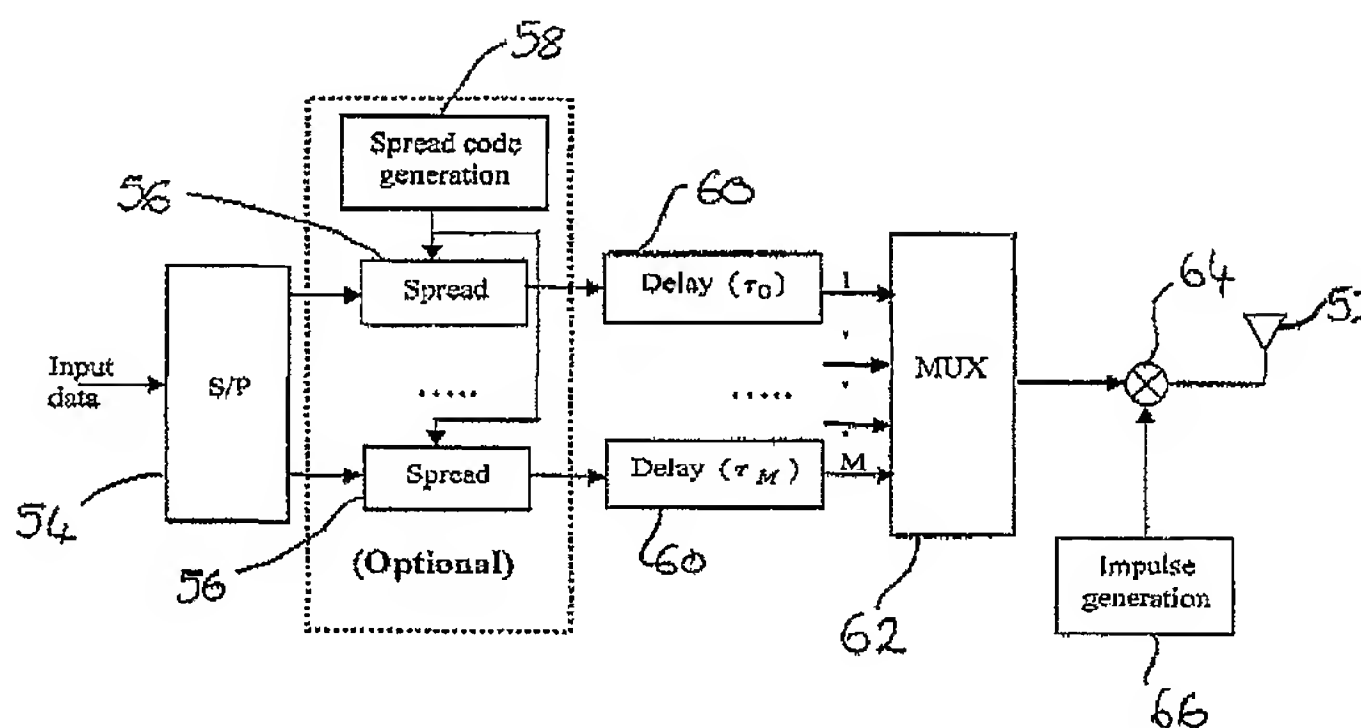
(75) Inventors/Applicants (for US only): **CHIN, Po Shin,**  
**Francois** [SG/SG]; Blk 940 Hougang St 92 #13-19, Sin-  
gapore 530940 (SG). **MADHUKUMAR, Appukuttan,**  
**Nair, Saraswathy, Amma** [IN/SG]; Blk 120 Jurong East  
St 13 #01-95, Singapore 600120 (SG).

**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv)) for US only

[Continued on next page]

(54) Title: A METHOD AND TRANSMITTER, RECEIVER AND TRANSCEIVER SYSTEMS FOR ULTRA WIDEBAND COMMUNICATION



(57) Abstract: A transmitter for transmitting data as a pulsed ultrawide band signal comprises a serial-to-parallel converter (54) for converting the signal to be transmitted to a parallel sequence, a modulator (64) to convert the parallel sequence to a parallel stream of impulse trains. A delay unit (60) delays the parallel streams of impulse trains by different time intervals within the same pulse repetition period. The delayed pulse streams are combined so that the pulses in the streams occur within the pulse repetition period of a single pulse. An antenna (52) is used to transmit the combined signal. A receiver comprises an antenna (72) for receiving a transmitted pulsed ultrawide band signal having two or more interleaved pulse trains with equal pulse repetition periods, the pulse repetition period being greater than the pulse spacing in the interleaved signal. A matched filter filters the received signal, the filter being matched to the pulse shape of the received signal. A low-pass filter (74) is coupled to the matched filter and an analogue-to-digital converter (76) is coupled thereto. A serial-to-parallel conversion unit (78) is coupled to the converter (76) to sample the digital signal at a rate greater than the pulse repetition frequency of the received signal. A signal processor (80) is coupled to the serial-to-parallel conversion unit (78) to produce an output signal representative of the received data.



**Published:**

— *with international search report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*